CURRICULUM INTENTION

AIMS OF THE MATHEMATICS CURRICULUM

Mastery in mathematics is defined as pupils having a deep understanding as a result of sustainable learning. Pupils will have the ability to build on something that has already been sufficiently mastered by reasoning about a concept and making connections between different areas of mathematics which will enable them to know more, understand more and remember more.

Depth of understanding will be judged based on a pupil's ability to reason and solve problems in familiar and then unfamiliar contexts and situations.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. In certain situations, where a child has a specific learning need that affects their mathematical ability, the school may provide additional support and if it deems necessary an alternative more appropriate, curriculum for that individual.

MATHEMATICS SKILLS PROGRESSION

The progression maps within this document are structured using the topic headings as they appear in the National Curriculum:

- Number – Number and Place Value
- Number – Addition and Subtraction
- Number – Multiplication and Division
- Number- Fractions (including decimals and percentages)
- Ratio and Proportion
- Measurement
- Geometry – properties of shapes
- Geometry – position and direction
- Statistics

Each of the above categories has been divided into subcategories to illustrate progression in key areas.

All programmes of study statements are included, and some appear twice. This is indicated in the text.

This occurs where:

- The statement has central relevance to more than one subcategory within a topic;
- The statement has central relevance to more than one mathematics topic. This is done to reflect the aims of the curriculum that *pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems* (Mathematics programmes of study: key stages 1 and 2 page 3). However, the connections made are not intended to be exhaustive and teachers should seek to support pupils in making other connections.

'ignite their own unique spark of genius, so that it catches fire and shines.'

RESEARCH BASED TEACHING SEQUENCE OF THE MATHEMATICS CURRICULUM

Teaching sequence in mathematics is based on research-based strategies and the teaching for mastery approach in maths**.**

The Principles of Instruction: Rosenshine 2010 / NCETM Teaching for Mastery 2014

Metacognition is predicated on something slightly different than 'best practice'. It comes from a place of 'effective practice'. In other words, practice that makes a difference. Metacognition is A powerful vehicle for helping to unlock learning and progress. At its simplest, metacognition is the ability to reflect on and think about your own learning more explicitly.

Metacognition, in essence has two key elements:

- **The awareness and recognition of how you are learning and progressing**
- **The ability to self-regulate your behaviour as a result of your awareness**

A Metacognitive route to better teaching in mathematics: C. Davies 2016

The Principles of Instruction	Four strands	Metacognition
1) Daily Review **2) Present new material using small steps** **3) Ask questions** **4) Provide Models (CPA)** **5) Guide pupil practice** **6) Check for pupil understanding** **7) Obtain a high success rate** **8) Provide scaffolds for difficult tasks)** **9) Independent practice** **10) Weekly / monthly review**	**Sequencing concepts and modelling** 2) present new material using small steps 4) provide models 8) provide scaffolds for difficult tasks **Questioning** 3) Ask questions 6) Check for pupil understanding **Reviewing Material** 1)Daily review 10) Weekly and monthly review **Stages of Practice** 5) guide pupil practice 7) Obtain a high success rate 9) independent practice	Metacognition refers to **higher order thinking** which involves active control over the cognitive processes engaged in learning. Activities such as ……..: • Planning how to approach a given learning task; (before) • Monitoring our comprehension of the task, (during) and • Evaluating progress toward the completion of a task. (after) Therefore, when learners are behaving metacognitively they will be: • Drawing on prior learning to plan and prepare • Using appropriate experience to monitor their performance • Highly involved in self-assessing and peer-assessing • Recognising and preparing for what is likely to be hard and challenging • Recalling similar challenges and applying successful strategies • Identifying new and novel solutions • Collaborating and identifying expertise • Offering and accepting feedback

NUMBER AND PLACE VALUE

COUNTING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Count reliably with numbers from one to twenty	count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number			count backwards through zero to include negative numbers	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	use negative numbers in context, and calculate intervals across zero
	count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100;	count in multiples of 6, 7, 9, 25 and 1000	count forwards or backwards in steps of powers of 10 for any given number up to 1000 000	
	given a number, identify one more and one less		find 10 or 100 more or less than a given number	find 1000 more or less than a given number		
COMPARING NUMBERS						
Say which number is one more or one less than a given number	use the language of: equal to, more than, less than (fewer), most, least	compare and order numbers from 0 up to 100; use <, > and = signs	compare and order numbers up to 1000	order and compare numbers beyond 1 000 *compare numbers with the same number of decimal places up to two decimal places* (copied from Fractions)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)
IDENTIFYING, REPRESENTING AND ESTIMATING NUMBERS						
Place numbers in order from one to 20	identify and represent numbers using objects and	identify, represent and estimate numbers using	identify, represent and estimate numbers using	identify, represent and estimate numbers using		

	pictorial representations including the number line	different representations, including the number line	different representations	different representations		

READING AND WRITING NUMBERS (including Roman Numerals)						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place numbers in order from one to 20.	read and write numbers from 1 to 20 in numerals and words.	read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words		read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Comparing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Understanding Place Value)
			tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (copied from Measurement)	read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	
	UNDERSTANDING PLACE VALUE					
		recognise the place value of each digit in a two-digit number (tens, ones)	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears

					(appears also in Reading and Writing Numbers)	also in Reading and Writing Numbers)
				find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths (copied from Fractions)	*recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents* (copied from Fractions)	*identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places* (copied from Fractions)

ROUNDING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				round any number to the nearest 10, 100 or 1 000	round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000	round any whole number to a required degree of accuracy
				round decimals with one decimal place to the nearest whole number (copied from Fractions)	*round decimals with two decimal places to the nearest whole number and to one decimal place* (copied from Fractions)	*solve problems which require answers to be rounded to specified degrees of accuracy* (copied from Fractions)
	PROBLEM SOLVING					
		use place value and number facts to solve problems	solve number problems and practical problems	solve number and practical problems that involve all of the above and with	solve number problems and practical problems	solve number and practical problems that involve all of the above

			involving these ideas.	increasingly large positive numbers	that involve all of the above	

READING AND WRITING NUMBERS (including Roman Numerals)						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	read and write numbers from 1 to 20 in numerals and words.	read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words		read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Comparing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Understanding Place Value)
			tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (copied from Measurement)	read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	
	UNDERSTANDING PLACE VALUE					
		recognise the place value of each digit in a two-digit number (tens, ones)	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)

				find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths (copied from Fractions)	(appears also in Reading and Writing Numbers) *recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents* (copied from Fractions)	*identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places* (copied from Fractions)

NUMBER AND PLACE VALUE VOCABULARY						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
One more One less Place Order Number Count Numbers up to twenty Number line Pictorial Answer Equals Read Write	**Same as EYFS plus:** Forwards Backwards Numerals Words Multiples Equal to More than Less than Fewer Most Least Identify Represent Digit Ones Tens Calculate Odd	**Same as EYFS & Year 1:** Two – digit number Estimate Place value Solve problems Greater than > Less than < Nearest ten Number facts Partition Count in steps Zero Compare Determine Value	**Same as EYFS & KS1** Hundreds Three- digit Ten more One hundred more Ten less One hundred more Ten less One hundred less Roman numeral Roman numeral Numbers up to one thousand	**Same as previous year groups, plus:** Thousands Four-digit Negative number One thousand more One thousand less Decimal Decimal Place Rounding Place Holder Nearest ten Nearest Hundred Nearest thousand One place Whole number Integer Tenths Hundredths	**Same as previous year groups, plus:** Ten thousands Hundred thousands Millions Context Steps of powers Decimal equivalents Two decimal places Thousandths Number up to one million	**Same as previous year groups, plus:** Intervals across zero Three decimal places Hundredths Thousandths Ten Thousandths Numbers up to ten million

	Even Pattern Numbers up to one hundred					

NUMBER: ADDDITION AND SUBTRACTION

NUMBER BONDS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	represent and use number bonds and related subtraction facts within 20	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100				
	MENTAL CALCULATION					
Use quantities and objects, add and subtract two – single digit numbers and count on or back to find the answer.	add and subtract one-digit and two-digit numbers to 20, including zero	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers	add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds		add and subtract numbers mentally with increasingly large numbers	perform mental calculations, including with mixed operations and large numbers
	read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods)	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot				use their knowledge of the order of operations to carry out calculations involving the four operations

WRITTEN METHODS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Use quantities and objects, add and subtract two – single digit numbers and count on or back to find the answer.	read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Mental Calculation)		add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	
	INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS					
		recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	estimate the answer to a calculation and use inverse operations to check answers	estimate and use inverse operations to check answers to a calculation	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

PROBLEM SOLVING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Solve problems, including doubling, halving and sharing.	solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ - 9	solve problems with addition and subtraction: * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
		solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from Measurement)				Solve problems involving addition, subtraction, multiplication and division

'ignite their own unique spark of genius, so that it catches fire and shines.'

ADDITION AND SUBTRACTION VOCABULARY

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Add Subtract Addition Subtraction Adding Subtracting Is the same as Number Single digit Count on Count back Answer Doubling Halving Sharing Numbers to twenty	**Same as EYFS plus:** One step problem Concrete object Pictorial representation **Addend** **Sum** **Minuend** **Subtrahend** **Difference** Missing number problem Read Write Interpret Equal to = Symbol Parts & whole One – digit Two- digit Ones Tens Mental Mentally Rods Dienes Tens frames	**Same as EYFS & Year 1:** Inverse Order Relationship Calculation Solve problems Missing number Quantities Measures Operation Apply Whole number Commutative Regroup Rename Exchange	**Same as EYFS & KS1** Three-digit number Hundreds Estimate Number facts Mental methods Formal methods	**Same as previous year groups, plus:** Two step problems Context Four-digit	**Same as previous year groups, plus:** Increasingly large numbers More than 4-digits Rounding Determine Context Multi-step problems	**Same as previous year groups, plus:** Estimation Mixed operations

MULTIPLICATION & DIVISION FACTS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	count in multiples of twos, fives and tens (copied from Number and Place Value)	*count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward* (copied from Number and Place Value)	*count from 0 in multiples of 4, 8, 50 and 100* (copied from Number and Place Value)	*count in multiples of 6, 7, 9, 25 and 1 000* (copied from Number and Place Value)	*count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000* (copied from Number and Place Value)	
		recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	recall multiplication and division facts for multiplication tables up to 12 × 12		
	MENTAL CALCULATION					
			write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (appears also in Written Methods)	use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers	multiply and divide numbers mentally drawing upon known facts	perform mental calculations, including with mixed operations and large numbers
		show that multiplication of two		recognise and use factor pairs and	multiply and divide whole	*associate a fraction with division and*

		numbers can be done in any order (commutative) and division of one number by another cannot		commutativity in mental calculations (appears also in Properties of Numbers)	numbers and those involving decimals by 10, 100 and 1000	*calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8)* (copied from Fractions)

WRITTEN CALCULATION						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (appears also in Mental Methods)	multiply two-digit and three-digit numbers by a one-digit number using formal written layout	multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers	multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
					divide numbers up to 4 digits by a one-digit number using the formal written method of	divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate

					short division and interpret remainders appropriately for the context	for the context divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
						use written division methods in cases where the answer has up to two decimal places (copied from Fractions (including decimals))

PROPERTIES OF NUMBERS: MULTIPLES, FACTORS, PRIMES, SQUARE AND CUBE NUMBERS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				recognise and use factor pairs and commutativity in mental calculations (repeated)	identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.	identify common factors, common multiples and prime numbers
					know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	*use common factors to simplify fractions; use common multiples to express fractions in the same denomination* (copied from Fractions)

					establish whether a number up to 100 is prime and recall prime numbers up to 19	
					recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	*calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3* (copied from Measures)

ORDER OF OPERATIONS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						use their knowledge of the order of operations to carry out calculations involving the four operations
	INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS					

			estimate the answer to a calculation and use inverse operations to check answers (copied from Addition and Subtraction)	*estimate and use inverse operations to check answers to a calculation* (copied from Addition and Subtraction)		use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

PROBLEM SOLVING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects	solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects	solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	solve problems involving addition, subtraction, multiplication and division
					solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	

					solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	*solve problems involving similar shapes where the scale factor is known or can be found* (copied from Ratio and Proportion)

MULTIPLICATION AND DIVISION VOCABULARY						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Same as EYFS plus: Multiples Twos Fives Tens Number Multiply Divide Multiplication Division One step problem Answer Concrete Pictorial representation Arrays Count Equals Write	**Same as EYFS & Year 1:** Multiplication facts Division facts Multiplication tables Odd numbers Even numbers Share Equally Repeated division Calculate	**Same as EYFS & KS1 plus:** multiplicand multiplier product Missing number problem Estimate Inverse Formal written method Mathematical statement Recall integer Two-digit One -digit	**Same as previous year groups, plus:** Derived facts Factors Factor pairs Scaling problems Three- digit	**Same as previous year groups, plus:** Decimals four – digit Long multiplication Short multiplication Remainders Context Common factors Common multiples Prime numbers prime factors composite numbers Square numbers cube number notation Squares Cubes	**Same as previous year groups, plus:** Scale factor Long division Whole number Remainders Fractions Rounding Mixed operations

FRACTIONS (INCLUDING DECIMALS AND PERCENTAGES)						
COUNTING IN FRACTIONAL STEPS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line (Non Statutory Guidance)	count up and down in tenths	count up and down in hundredths		
RECOGNISING FRACTIONS						
	recognise, find and name a half as one of two equal parts of an object, shape or quantity	recognise, find, name and write fractions $^{1}/_{3}$, $^{1}/_{4}$, $^{2}/_{4}$ and $^{3}/_{4}$ of a length, shape, set of objects or quantity	recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators	recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (appears also in Equivalence)	
			recognise that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10.			
	recognise, find and name a quarter as one of four equal		recognise and use fractions as numbers: unit fractions and non-			

	parts of an object, shape or quantity		unit fractions with small denominators			
	COMPARING FRACTIONS					
			compare and order unit fractions, and fractions with the same denominators		compare and order fractions whose denominators are all multiples of the same number	compare and order fractions, including fractions >1

COMPARING DECIMALS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				compare numbers with the same number of decimal places up to two decimal places	read, write, order and compare numbers with up to three decimal places	identify the value of each digit in numbers given to three decimal places
	ROUNDING INCLUDING DECIMALS					
				round decimals with one decimal place to the nearest whole number	round decimals with two decimal places to the nearest whole number and to one decimal place	solve problems which require answers to be rounded to specified degrees of accuracy
	EQUIVALENCE (INCLUDING FRACTIONS, DECIMALS AND PERCENTAGES)					
		write simple fractions e.g. $^1/_2$ of 6 = 3 and recognise the equivalence of $^2/_4$ and $^1/_2$.	recognise and show, using diagrams, equivalent fractions with small denominators	recognise and show, using diagrams, families of common equivalent fractions	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	use common factors to simplify fractions; use common multiples to express fractions in the same denomination

				recognise and write decimal equivalents of any number of tenths or hundredths	read and write decimal numbers as fractions (e.g. 0.71 = $^{71}/_{100}$)	associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^{3}/_{8}$)
					recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	
				recognise and write decimal equivalents to $^{1}/_{4}$; $^{1}/_{2}$; $^{3}/_{4}$	recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator 100 as a decimal fraction	recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

ADDITION AND SUBTRACTION OF FRACTIONS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			add and subtract fractions with the same denominator within one whole (e.g. $^{5}/_{7}$ + $^{1}/_{7}$ = $^{6}/_{7}$)	add and subtract fractions with the same denominator	add and subtract fractions with the same denominator and multiples of the same number	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
					recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a	

					mixed number (e.g. $^{2}/_{5} + {}^{4}/_{5} = {}^{6}/_{5} = 1\,{}^{1}/_{5}$)	
MULTIPLICATION AND DIVISION OF FRACTIONS						
					multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $^{1}/_{4} \times {}^{1}/_{2} = {}^{1}/_{8}$)
						multiply one-digit numbers with up to two decimal places by whole numbers
						divide proper fractions by whole numbers (e.g. $^{1}/_{3} \div 2 = {}^{1}/_{6}$)

MULTIPLICATION AND DIVISION OF DECIMALS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						multiply one-digit numbers with up to two decimal places by whole numbers
				find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value		multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places

				of the digits in the answer as ones, tenths and hundredths		
						identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
						associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^{3}/_{8}$)
						use written division methods in cases where the answer has up to two decimal places

PROBLEM SOLVING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			solve problems that involve all of the above	solve problems involving increasingly harder fractions to calculate quantities, and fractions to	solve problems involving numbers up to three decimal places	

				divide quantities, including non-unit fractions where the answer is a whole number		
				solve simple measure and money problems involving fractions and decimals to two decimal places.	solve problems which require knowing percentage and decimal equivalents of $^{1}/_{2}$, $^{1}/_{4}$, $^{1}/_{5}$, $^{2}/_{5}$, $^{4}/_{5}$ and those with a denominator of a multiple of 10 or 25.	

FRACTIONS (INCLUDING DECIMALS AND PERCENTAGES) VOCABULARY						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Same as EYFS plus: Fractions Half Equal parts One whole Object Shape Quantity Quarter	**Same as EYFS & Year 1:** Simple fractions Equivalent Equivalence Count	**Same as EYFS & KS1 plus:** tenths unit fractions non-unit fractions numerator denominator compare order add subtract solve problems	**Same as previous year groups, plus:** Hundredths Decimal Decimal place One decimal place Two decimal places Round decimals Whole number Common equivalent fractions Decimal equivalents Dividing	**Same as previous year groups, plus:** Thousandths Multiples Three decimal places Per cent Number of parts per hundred Percentages Decimal fraction Mixed numbers Improper fraction	**Same as previous year groups, plus:** Common factors Common multiples Decimal fraction equivalents Simplest form

				Ones Tenths Hundredths Simple measure Money problems	Proper fractions Convert Mathematical statements Multiply Percentage and decimal equivalents	

MEASUREMENT						
COMPARING AND ESTIMATING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Children use everyday language to talk about size, weight, capacity, to compare quantities and objects and to solve problems	compare, describe and solve practical problems for: * lengths and heights [e.g. long/short, longer/shorter, tall/short, double/half] * mass/weight [e.g. heavy/light, heavier than, lighter than] * capacity and volume [e.g. full/empty, more than, less than, half, half full, quarter]	compare and order lengths, mass, volume/capacity and record the results using >, < and =		estimate, compare and calculate different measures, including money in pounds and pence (also included in Measuring)	calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes (also included in measuring)	calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3.
					estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water)	

	* time [e.g. quicker, slower, earlier, later]					
	sequence events in chronological order using language [e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	compare and sequence intervals of time	compare durations of events, for example to calculate the time taken by particular events or tasks			
			estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight (appears also in Telling the Time)			

MEASURING and CALCULATING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Children use everyday language to talk about size, weight, capacity, to compare quantities and objects and to solve problems	measure and begin to record the following: * **lengths and heights** * **mass/weight** * **capacity and volume** * **time** (hours, minutes, seconds**)**	choose and use appropriate standard units to estimate and measure **length/height** in any direction (m/cm); **mass** (kg/g); **temperature** (°C); **capacity** (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels	measure, compare, add and subtract: **lengths** (m/cm/mm); **mass** (kg/g); **volume/capacity** (l/ml)	estimate, compare and calculate **different measures,** including **money in pounds and pence** (appears also in Comparing)	use all four operations to solve problems involving measure (e.g. **length, mass, volume, money**) using decimal notation including scaling.	solve problems involving the calculation and conversion of **units of measure**, using decimal notation up to three decimal places where appropriate (appears also in Converting)
			measure the **perimeter** of simple 2-D shapes	measure and calculate the **perimeter** of a rectilinear figure (including squares) in centimetres and metres	measure and calculate the **perimeter** of composite rectilinear shapes in centimetres and metres	recognise that shapes with the same areas can have different **perimeters** and vice versa

TELLING THE TIME						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Children use everyday language to talk about time to solve problems	tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.	tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks	read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting)		
	recognise and use language relating to dates, including days of the week, weeks, months and years	know the number of minutes in an hour and the number of hours in a day. (appears also in Converting)	estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight (appears also in Comparing and Estimating)			
				solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Converting)	solve problems involving converting between units of time	

CONVERTING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		know the number of minutes in an hour and the number of hours in a day. (appears also in Telling the Time)	know the number of seconds in a minute and the number of days in each month, year and leap year	convert between different units of measure (e.g. kilometre to metre; hour to minute)	convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
				read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting)	solve problems involving converting between units of time	solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate (appears also in Measuring and Calculating)
				solve problems involving converting from hours to minutes;	understand and use equivalences between metric units and	convert between miles and kilometres

				minutes to seconds; years to months; weeks to days (appears also in Telling the Time)	common imperial units such as inches, pounds and pints	

MEASUREMENT VOCABULARY						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Measure Measurement Size Weight Capacity Compare Solve Problems Object Time	**Same as EYFS plus:** Length Height Long Short Longer Shorter Tall Double Half Mass Heavy Light Heavier than Lighter than Volume Full Empty More than Less than half full Quarter	**Same as EYFS & Year 1:** Greater than > Less than < Equals = intervals Standard units Estimate Direction Temperature Unit Scales Rulers Thermometers Measuring vessels Metres Centimetres Kilograms Grams Degrees Celsius Litres Millilitres Symbols Money	**Same as EYFS & KS1 plus:** duration time taken nearest minute record seconds a.m. p.m. noon midnight kilometre add subtract millimetres perimeter simple 2-D shapes analogue clock roman numerals 12-hour 24-hour leap year	**Same as previous year groups, plus:** Estimate Rectilinear figure Area rectilinear shapes Convert	**Same as previous year groups, plus:** Square centimetres (cm^2) Square metres (m^2) Irregular shapes Volume (cm^3) Cubes Cuboids Square numbers Cube numbers Metric measure Metric units Imperial units Inches Pounds Pints	**Same as previous year groups, plus:** Decimal notation Cubic centimetres (cm^3) Cubic metres (m^3) Cubic millimetres (mm^3) Cubic kilometre (km^3) Decimal places Formulae Miles

	Slower Earlier Later Sequence events Chronological order Before After Next First Today Yesterday Tomorrow Morning Afternoon Evening Record Hours Minutes Hour Half past O clock Hands Clock face Seconds Coins Notes Dates Days Weeks Months Years	Pounds (£) Pence (P) Different Combinations Change Five past Ten past Quarter past Twenty past Twenty-five past Half past Twenty-five to Twenty to Quarter to Ten to Five to				

GEOMETRY: PROPERTIES OF SHAPE

IDENTIFYING SHAPES AND THIER PROPERTIES

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Explore characteristics of everyday objects and shapes and use mathematical language to describe them	recognise and name common 2-D and 3-D shapes, including: * 2-D shapes [e.g. rectangles (including squares), circles and triangles] * 3-D shapes [e.g. cuboids (including cubes), pyramids and spheres].	identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line		identify lines of symmetry in 2-D shapes presented in different orientations	identify 3-D shapes, including cubes and other cuboids, from 2-D representations	recognise, describe and build simple 3-D shapes, including making nets (appears also in Drawing and Constructing)
		identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces				illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
		identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]				

DRAWING AND CONSTRUCTING

			draw 2-D shapes and make 3-D shapes using	complete a simple symmetric figure with respect to a	draw given angles, and measure them in degrees (^{o})	draw 2-D shapes using given

			modelling materials; recognise 3-D shapes in different orientations and describe them	specific line of symmetry		dimensions and angles
						recognise, describe and build simple 3-D shapes, including making nets (appears also in Identifying Shapes and Their Properties)

COMPARING AND CLASSIFYING						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		compare and sort common 2-D and 3-D shapes and everyday objects		compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	use the properties of rectangles to deduce related facts and find missing lengths and angles	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
					distinguish between regular and irregular polygons based on reasoning about equal sides and angles	

	ANGLES					
			recognise angles as a property of shape or a description of a turn		know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	
			identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle	identify acute and obtuse angles and compare and order angles up to two right angles by size	identify: * angles at a point and one whole turn (total 360°) * angles at a point on a straight line and ½ a turn (total 180°) * other multiples of 90°	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
			identify horizontal and vertical lines and pairs of perpendicular and parallel lines			

GEOMETRY: PROPERTIES OF SHAPES VOCABULARY						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Shape Square Rectangle Circle Triangle sides Straight side Curved side	**Same as EYFS plus:** 2-D shapes 3-D shapes Two-dimensional Three-dimensional Cuboid Cube Pyramid Cone Cylinder sphere	**Same as EYFS & Year 1:** Properties Compare Common Line symmetry Vertical line Edges Faces Vertices Pentagon Hexagon Heptagon Octagon Nonagon Decagon Kite Rhombus Polygon Square-based pyramid Triangular pyramid Triangular prism Rectangular prism Pentagonal prism Hexagonal prism Octagonal prism Octahedron Dodecahedron Tetrahedron	**Same as EYFS & KS1 plus:** angle turn right angles quarter of a turn half-turn three quarters of a turn complete turn horizontal lines vertical lines perpendicular lines parallel lines	**Same as previous year groups, plus:** lines of symmetry symmetric figure classify geometric shapes quadrilaterals acute angle obtuse angle	**Same as previous year groups, plus:** Angles Measure Degrees Missing lengths Missing angles Regular polygons Irregular polygons Degrees Estimate compare Reflex angle Point Straight line Multiples	**Same as previous year groups, plus:** Radius Diameter Circumference Nets

		Rectangular pyramid Pentagonal pyramid Hexagonal pyramid Octagonal pyramid				

GEOMETRY: PROPERTIES OF SHAPES VOCABULARY					
POSITION, DIRECTION AND MOVEMENT					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
describe position, direction and movement, including half, quarter and three-quarter turns.	use mathematical vocabulary to describe position, direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)		describe positions on a 2-D grid as coordinates in the first quadrant	identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed	describe positions on the full coordinate grid (all four quadrants)
			describe movements between positions as translations of a given unit to the left/right and up/down		draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
			plot specified points and draw sides to complete a given polygon		
PATTERN					
	order and arrange combinations of mathematical objects				

	in patterns and sequences				

INTERPRETING, CONSTRUCTING AND PRESENTING DATA					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	interpret and construct simple pictograms, tally charts, block diagrams and simple tables	interpret and present data using bar charts, pictograms and tables	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	complete, read and interpret information in tables, including timetables	interpret and construct pie charts and line graphs and use these to solve problems
	ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity				
	ask and answer questions about totalling and comparing categorical data				
SOLVING PROBLEMS					

		solve one-step and two-step questions [e.g. 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.	solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	solve comparison, sum and difference problems using information presented in a line graph	calculate and interpret the mean as an average

Four quadrants **GEOMETRY: POSITION AND DIRECTION VOCABULARY**						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Position Distance Direction Move Movement Pattern	**Same as EYFS plus:** Half turn Quarter -turn Three-quarter Left Right Up down	**Same as EYFS & Year 1:** Rotation Right- angle Clockwise Anti-clockwise Order Arrange Sequence	**Same as EYFS & KS1 plus:**	**Same as previous year groups, plus:** Co-ordinates Quadrant Grid Translate Translation Axis x-asis y- axis spaces unit plot point polygon	**Same as previous year groups, plus:** Reflection	**Same as previous year groups, plus:**

RATIO AND PROPORTION					
Statements only appear in Year 6 but should be connected to previous learning, particularly fractions and multiplication and division					
					Year 6
					solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
					solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
					solve problems involving similar shapes where the scale factor is known or can be found
					solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

RATIO AND PROPORTION VOCABULARY						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						Ratio Proportion Size Quantity Missing value Integer Multiplication Division Multiply Divide Solve Problem Calculate Percentage Comparison Unequal sharing Grouping Fractions Multiples

ALGEBRA					
EQUATIONS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and ***missing number problems*** *such as* *7 = □ - 9* (copied from Addition and Subtraction)	*recognise and use the inverse relationship between addition and subtraction and use this to check calculations and* ***missing number*** *problems.* (copied from Addition and Subtraction)	solve problems, *including* ***missing number*** *problems, using number facts, place value, and more complex addition and subtraction.* (copied from Addition and Subtraction) *solve problems, including* ***missing number*** *problems, involving multiplication and division, including integer scaling* (copied from Multiplication and Division)		*use the properties of rectangles to deduce related facts and find* ***missing lengths and angles*** (copied from Geometry: Properties of Shapes)	express missing number problems algebraically
	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (copied from Addition and Subtraction)				find pairs of numbers that satisfy number sentences involving two unknowns
represent and use number bonds and related subtraction facts within 20 (copied from Addition and Subtraction)					enumerate all possibilities of combinations of two variables

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

			Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit. *(Copied from NSG measurement)*		use simple formulae *recognise when it is possible to use **formulae** for area and volume of shapes* (copied from Measurement)
SEQUENCES					
sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening (copied from Measurement)	*compare and sequence intervals of time* (copied from Measurement) *order and arrange combinations of mathematical objects in patterns* (copied from Geometry: position and direction)				generate and describe linear number sequences

ALGEBRA VOCABULARY						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Solve One-step problem Missing number Check Calculate Problem	**Same as Year 1:** Inverse Relationship Compare Order Arrange	**Same as EYFS & KS1 plus:**	**Same as previous year groups, plus:** Perimeter Algebra Algebraically	**Same as previous year groups, plus:** Properties Rectangles Deduce Related facts	**Same as previous year groups, plus:** Missing number Problem Pairs Number sentence

	Sequence chronological	Pattern			Missing lengths Missing angles	Variables Combination Possibility Enumerate Equation Formulae Generate Linear number sequence